Denver Water

Operations and Maintenance Division
Standard Operating Procedure
Subject : Valve Inspections
Item : Pressure Regulating Valves (PRVs)
Date : September 1, 1999
Revision Date:

Purpose

A. To establish guidelines for the inspection and operation of Pressure Regulating Valves (PRVs) in the Denver Water distribution system. Also to establish safety procedures which will provide adequate protection for workers and the public.

Policy

A. It shall be the policy of Denver Water to conduct routine and systematic inspection of all PRVs in the water distribution system four times every year.
B. It shall be the policy of Denver Water to maintain correct pressure settings of all PRVs to assure that the distribution system is operated in an efficient manner.
C. It shall be the policy of Denver Water that any necessary repairs are completed in a timely manner.

Equipment

A. A vehicle equipped with overhead warning lights and traffic safety equipment is essential to provide protection in traffic lanes for workers and to clearly delineate the presence of an unusual situation for drivers and pedestrians.
B. Field maps of existing water distribution piping are required to assist in determining the correct PRV at a given location.
C. Workers must be provided with personal safety equipment i.e. hard hat, traffic safety vest, toe protection.
D. Tools required include a valve box and manhole opening tool, tools for cleaning debris from valve boxes, a valve operating key, pliars, screwdriver.
D. Air quality analyzer
    1. Test for safe oxygen levels.
    2. Test for explosive gases.
    3. Test for poisonous gases.
F. Ventilating air blower
G. Dark blue and light blue water-proof spray paint will be required to mark valve box lids.

1. Dark blue is designated as the color used to mark water facilities in the street by utilities nation-wide.
2. Light blue is used to mark normally closed valves.

Procedure

A. Using maps and records from previous inspections, locate the correct PRV and valves in a given location. Items concerning the target PRV and the associated gate valves that must be known before operating the valve are:
   1. What size is this PRV?
   2. What size are the isolation valves and the closed by-pass valve?
   3. How many turns on these valves?
      a. It can be determined how many turns are required to operate the valves from full open to full closed. The formula is as follows: 3 times the diameter plus 3 equals total full turns. Of course this will be doubled for half turns.

B. What direction do these valves operate?
   1. In the Denver Water distribution system a standard valve is referred to as a Left Hand Valve (LHV). This is a valve that is turned from left to right in order to close the valve. Many districts do not utilize LHVs, therefore it is imperative that the inspector know which way the valve operates. As one would reason if the valve is not a LHV it must be a Right Hand Valve (RHV).

C. What size is the main?

D Align vehicle in the street so as to cause minimal traffic interuption. Utilize all traffic safety equipment.
   1. Warning lights
   2. Traffic cones
   3. Flags
   4. Flagman if determined necessary
   5. Remove manhole cover

E. Visually inspect the PRV through the manhole for packing leak or obstructions.

F. Ventilate vault
   1. Enter vault only after atmosphere has been tested and found to be safe.
   2. Continue ventilating vault at all times when a worker is inside the structure.

G. Attach a pressure guage to the downstream petcock to determine the current pressure and to monitor pressure during the inspection process.

H. Take a few moments to observe the operating cycle of the PRV.
   1. At what pressure does it come open and a what pressure does it go closed?
   2. Is the operating range observed set correctly to supply the desired downstream hydraulic gradeline?

I. Open the cap on the needle valve. This controls the speed of operation.

1. Close the needle by turning clock-wise. Then reopen the needle to previous setting. This is usually 1 ½ to 2 full turns.
2. Retighten the cap.

J. Loosen the lock nut on the pilot valve. This is where pressure is set.
1. Turn pilot stem clock-wise to raise pressure.
2. Turn pilot stem counter-clock-wise to lower pressure.
3. Be sure to re-tighten the lock nut after setting pressure.

K. Open the petcock under the strainer to flush out the screen.
1. It may be necessary to remove the bottom of the strainer and wash the screen manually.

L. Visually inspect the packing gland around the operating stem.
1. If the packing is leaking the PRV will malfunction.
   a. Tighten the packing carefully. If it is too tight it will seize up the stem.
2. If the packing continues to leak, the packing must be replaced during a complete shutdown of the PRV.

M. If a PRV malfunction cannot be remedied by the service functions above, it may be necessary to remove it from service and schedule prompt repairs.
1. An important consideration – is an alternate suppy possible in the event of an outage?

N . Remove debris from isolation valve box lids and paint with dark blue paint on the outside surface of the lid.
1. This will clearly show which valves have been inspected and;
2. Assist in locating valves in emergency situations.

O . Remove debris from closed by-pass valve box lid and paint with light blue paint on the inside and outside surfaces of the lid.
1. This valve should be considered a Closed Boundary Valve and painted light blue as described in CBV Standard Operating Procedure.

P . Move vehicle from the traffic lanes to a location where the worker can safely record all the information determined by the current inspection.

Q . Record the following information for future use:
1. Location of PRV, for example; st property line (EPL)
2. Size of PRV
3. Size of main
4. Make of PRV
5. Model of PRV
6. Pressure setting
7. Hydraulic gradeline of PRV
8. Date of inspection
9. Name of inspector
10. Needed repairs
11. Keep in mind that;
    a. Previous inspections may have produced incorrect information.
    b. Information on maps may be incorrect and each inspection gives an opportunity to get correct information.